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ABSTRACT

A proposal is described to provide objective test results from the yearly School Certificate/GCE Examinations in Nigeria as computer-generated feedback information to individual schools and the Ministries of Education. Absolute, ipsative, and normative analyses would be presented for syllabus topics within each subject matter, and for each subject matter as a whole. The purpose of this scheme is successive and pyramidal improvement of classroom teaching in weak topics and subjects without awaiting curriculum reforms or changes in educational philosophy. (Author)

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OBJECTIVE TESTING AND THE IMPROVEMENT
OF SECONDARY EDUCATION IN WEST AFRICA

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An often-heard criticism of education systems wherein students must sit for and perform successfully on an external examination at the end of their studies is that instruction under such a system consists essentially of preparing the candidates for the test. The examination syllabus too often serves as manual for the classroom teacher. What topics to stress for what portion of the school year, practice in answering past test questions assume disproportionate importance in the educational scheme. The Deweyian concept of education as "preparation for life" is not much in evidence. It would not be inaccurate to apply a characterization of this sort to large segments of the education systems currently existing in the countries of Anglophone West Africa. For compelling historical reasons the English model is followed wherein students, at the end of secondary school, sit for the externally set School Certificate/ General Certificate of Education (SC/GCE) (Ordinary Level) Examination. It is this examination toward which secondary education is geared.

Although long term educational reform would seem to be indicated, what follows is not a proposal to do away with

the external examination system nor a treatise to substitute Dewey's educational philosophy for the existing approach. Nor is it a consideration of curriculum reform. What follows rather is an analysis of a way in which the objective test results of the yearly SC/GCE Examinations can, in the short term, be used as recurrent feedback information to improve classroom education within the existing educational framework of Nigeria, Ghana, and other West African countries. Even if the current system has shortcomings let us consider how to utilize its attributes to increase the quality of the educational product. Moreover, should curriculum revision occur in the future, the proposed scheme will apply equally to a new syllabus.

At the present time only partial use is being made each year of the SC/GCE objective test results by the West African Examinations Council and the educational community. Making use of objective test papers to generate grades of student proficiency upon which to grant scholastic certificates of accomplishment is good and proper and should be encouraged. However, setting objective papers is costly, arduous, and time consuming and there is an additional function, with important ramifications, that these same objective test papers could and should be serving.

That function is to provide information to individual schools as well as to State Ministries of Education about

the performance of their own candidates on each syllabus topic of each subject in which an objective paper is set.

Our analysis contains a three-phase proposal to make full use of the yearly objective test results. The information required to do this is a reporting back of the relative incidence of correct answers on each syllabus topic so that teaching of weak topics can (through various means to be mentioned) be improved the succeeding year. That is the crux of it. Repeated use of such test feedback data year after year will then have the effect of gradually improving the educational quality in all the schools of a country.^{1/} The WAEC would thereby make a fundamental contribution to the raising of educational standards in its member countries. The raising of standards in this way would be both meaningful and vital.

A basic assumption of our proposal is that wide variation in pupils' ethnic background, urban-rural location, socio-economic status, sex, teachers' qualifications and interests all make for a situation that calls for information specific to each school and each state. Further, we propose

^{1/} TEDRO (WAEC) has in the past produced yearly Reports on the Objective Test Papers of the WAEC's SC/GCE Examination. For the purposes proposed here, however, these reports are both too general and too detailed. Too general in that the analysis is based on a sample of the total group of candidates; too detailed in that, although some summarizing statements are made, the data are presented as a post hoc item analysis with percent of candidates choosing alternatives A, B, C, etc. on individual items.

to limit the information presented to per cent correct responses on various syllabus topics, rather than response frequencies on various multiple choice alternatives of individual test questions.

Thus, what is envisaged here is yearly feedback to each school^{2/} and, for Nigeria at least, to each State of their own pupils' performance in each of the eight subject matters in which objective SC/GCE papers are currently set, i.e.: English Language, Geography, Physics, Chemistry, Biology, Health Science, Mathematics, and French, and in any additional subjects set in the future. Each school would thus have objective evidence regarding which subjects it was strong in, which it was weak in, and within subjects, which syllabus topic needed better coverage. Subjects and curriculum topics showing relatively low percentage correct results in a particular school could then be more adequately stressed the succeeding year. The mechanism for this might be: increased class time devoted to the subject or topic, encouragement of outside reading by the pupils, assigned reading to the teacher(s) to make him (them) better qualified, review of teaching method, preparation of supplementary text material, and/or purchase or construction of laboratory equipment for practicum and demonstration purposes.

^{2/} Our current thought is that private candidates should be excluded from this analysis, at least initially.

Also, if a State Ministry of Education becomes aware from study of their State Test Feedback Analysis in Biology, for example, that their candidates throughout the State generally did well on: "The Mammal", "Other Vertebrates" and "Insects"; average on everything else; but very poorly (low per cent correct answers) on "Plant Physiology" and "Ecology" they have a basis to institute corrective remedial action for the succeeding year on a state wide basis.

The Ministry might order supplementary text materials written and distributed to schools, organize refresher workshops on these topics for biology teachers, and/or improve the State's schools laboratory facilities to demonstrate these topics.

The technical requirements of such a scheme are not formidable. The TEDRO Item Preparation Department would have to indicate, by code, to which syllabus category each particular item on the live test (primarily) belonged.^{3/} The Data Processing Department would list by school the average percentage correct answers for each of the subjects and syllabus topics. This will entail logic programmed into the computer in order to: (1) identify and count right and wrong responses; (2) combine these counts for each coded subject matter and syllabus topic; and (3) listing of elements in rank order. A well written instruction sheet

^{3/} This is easily derivable from the Table of Specifications from which assignments are now made to item writers.

to interpret the data properly will have to be prepared and distributed to headmasters and cognisant ministry staff.

The Test Feedback Analysis (TFA) would provide each school with two Data Forms. The first would deal with only ^{4/} one subject and might look like this:

1972 SC/GCE Objective Test
School Feedback Analysis
Form I: Individual Subject Matter

State: 02 School: 0135

No. of Candidate: 038 Subject: 05 Biology

| <u>Syllabus Topics</u> | <u>Average % Correct</u> <u>Answers at</u> <u>Your School</u> | <u>Your School's</u> <u>Performance</u> <u>Compared to</u> <u>Other Schools</u> <u>in Your State</u> |
|----------------------------|---|--|
| 03 (Insects) | 80 | Average |
| 01 (The Mammal) | 67 | Good |
| 02 (Other Vertebrates) | 62 | Poor |
| 06 (Flowering Plants) | 54 | Good |
| 05 (Microscopic Organisms) | 52 | Good |
| 04 (Intestinal Worms) | 46 | Average |
| 07 (Plant Physiology) | 33 | Poor |
| 08 (Ecology) | 18 | Average |

^{4/} The technical reader will note that absolute, ipsative, and normative information is provided. The first is from the magnitude of the percentages. The second, from the rank ordering of the topics (i.e. the top ones are a school's strong areas, the bottom ones the weak topics.) Normatively, a rating of Good, Average, or Poor would be attached to each element depending on whether the particular "% Correct" was in the top, middle, or bottom thirds of its own distribution for all schools in the State.

This would indicate that candidates at school 0135 were less well prepared on syllabus topics 07 and 08 than on the other areas of Biology. However, this school's poor absolute performance (18%) on Ecology (08) was just about average in the State, whereas the higher performance on Plant Physiology (07) was Poor compared to other schools. Similarly, note that Insects which was this school's best biology topic was only average in comparison with the rest of the State.

The school can now plan corrective action for the following year. The first priority should be given to Syllabus topics which result in:

- 1) low % correct answers,
- 2) low position in the rank order, and
- 3) are rated Poor.

In our example this would be, foremost, (07) Plant Physiology. The biology teacher may be instructed to spend more time or exert more enthusiasm in class on plant physiology. He/she may be instructed to do some outside reading on the topic or enroll for an extension course.

The second form would summarize the data for all subjects at a particular school thus:

1972 SC/GCE Objective Test
School Feedback Analysis
Form II: All Subject Matters

State: 02 School: 0135

No. of Candidate: 038

| <u>Subject</u> | <u>Average % Correct Answers</u> | <u>Your School's Performance Compared to Other Schools in Your State</u> |
|---------------------|--|--|
| 07 Mathematics | 73 | Good |
| 04 Chemistry | 71 | Good |
| 03 Physics | 70 | Average |
| 02 Geography | 63 | Poor |
| 08 French | 60 | Good |
| 05 Biology | 59 | Average |
| 06 Health Science | 58 | Poor |
| 01 English Language | 55 | Average |

Clearly Mathematics and Chemistry are School 0135's forte, English Language, and Health Science the weakest areas. Their English Language performance is however no worse than other schools in the State.

Two similar forms would then be produced for each State Ministry of Education summarizing the test data for candidates from all the schools in their States. Ratings of Poor, Average, and Good could be derived by comparing any State's performance with the other States if this were deemed desirable.

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Based on preliminary discussions of this scheme with
the Data Processing Department ^{5/} I propose the following work
plan:

Phase I: 1972 : Pilot Study: 1972 SC/GCE Objective Papers

- A. Write computer logic program as specified above
- B. Debug program
- C. Limit TFA to Lagos State schools only
- D. Write and pretest Instructions for
Interpretation (to Headmasters and Ministry)
- E. Solicit views of recipients of the TFA
concerning utility and improvements
- F. Review Phase I and determine optimum
scheduling for data processing and
information dissemination.

Phase II. Begin with 1973 SC/GCE Examination

- A. Incorporate lessons learned in Phase I
- B. Expand the TFA throughout Nigeria to all
12 States.

Phase III. Beginning 1974

- A. If the Nigerian experience warrants it,
provide the scheme to other member
countries of the WAEC if they desire it.

^{5/}

Mr. John Sisam, WAEC, and Dr. Bryan Axtell, USAID
Educational Measurement Specialist, made some valuable
contributions which are incorporated in the proposal. Any
shortcomings, however, are the responsibility of the author.